

REMARKS

Applicant requests favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

The specification has been amended to place the subject application in better form. Specifically, Applicant has corrected a minor informality on page 5. No new matter has been added by this change.

Claims 37-49 and 61-71 are presented for consideration. Claims 37, 49, 61 and 71 are independent. Claims 50-60 have been canceled without prejudice or disclaimer. Claims 37, 38, 40, 46, 47 and 49 have been amended to clarify features of the subject invention. Support for these changes can be found in the original application, as filed. Therefore, no new matter has been added.

Applicant requests favorable reconsideration and withdrawal of the rejection set forth in the above-noted Office Action.

Claims 37-60 were rejected under 35 U.S.C. § 103 as being unpatentable over the Cognex Corporation User's Manual in view of U.S. Patent No. 5,825,913 to Rostami et al. Applicant submits that the cited art, whether taken individually or in combination, does not teach many features of the present invention, as previously recited in claims 37-60. Therefore, this rejection is respectfully traversed. Nevertheless, Applicant submits that independent claims 37, 49, 61 and 71, for example, as presented, amplify the distinctions between the present invention and the cited art.

In one aspect of the invention, independent claim 37 recites a position detection apparatus for detecting a position of a mark on an object. The apparatus includes a camera which captures an image of the mark, an extraction section which extracts an edge position of the mark based on a signal derived from the image of the mark, the edge position being extracted with respect to each combination of a direction and a polarity of the signal, and a determination section which determines a position of the mark, by comparing the edge position, with respect to each combination, with a corresponding template prepared with respect to each combination.

In another aspect of the invention, independent claim 49 recites a position detection method of detecting a position of a mark on an object. The method includes steps of capturing an image of the mark using a camera, extracting an edge position of the mark based on a signal derived from the image of the mark, the edge position being extracted with respect to each combination of a direction and a polarity of the signal, and determining a position of the mark by comparing the edge position, with respect to each combination, with a corresponding template prepared with respect to each combination.

In still another aspect of the invention, independent claim 61 recites a position detection apparatus for detecting a position of a mark on an object. The apparatus includes a camera which captures an image of the mark, an extraction section which extracts an edge position of the mark based on the image of the mark, a determination section which determines a position of the mark by comparing the edge position with a template and a control section which changes a parameter used by at least one of the extraction section and the determination section, based on a result of the comparing by the determination section.

In still another aspect of the invention, independent claim 71 recites a position detection method of detecting a position of a mark on an object. The method includes steps of capturing an image of the mark using a camera, extracting an edge position of the mark based on the image of the mark, determining a position of the mark by comparing the edge position with a template, and changing a parameter used in at least one of the extraction step and the determination step, based on the result of the comparing in the determining step.

Applicant submits that the cited art does not teach or suggest such features of the present invention, as recited in the independent claims.

The Examiner asserts that the Cognex Corporation User's Manual discloses a position detection apparatus for detecting a position of a mark on an object, the apparatus including an extraction section and a determination section. Applicant submits, however, that the cited manual does not teach or suggest at least the features of the present invention recited in independent claim 37 of an extraction section which extracts an edge position of a mark based on a signal derived from an image of the mark, the edge position being extracted with respect to each combination of a direction and a polarity of the signal, and a determination section which determines a position of the mark by comparing the edge position, with respect to each combination, with a corresponding template prepared with respect to each combination. Applicant notes that the cited manual discusses the use of a correlation coefficient r which is in the range of -1 to 1, inclusive. Applicant submits, however, that this disclosure is irrelevant to an edge position extraction with respect to each combination of a direction and a polarity of a signal, in the manner of the present invention recited in independent claim 37. In this regard, the noted

portion of the cited manual teaches nothing regarding extracting an edge position with respect to each polarity of the correlation coefficient r . Applicant submits, therefore, that the cited manual does not teach or suggest the foregoing features of the present invention recited in independent claim 37.

For reasons similar to those discussed above, Applicant submits that the cited manual does not teach or suggest the salient features of Applicant's present invention, as recited in independent claim 49. In this regard, independent claim 49 is a method claim, which has been patterned after independent claim 37, which is an apparatus claim.

Still further, new independent claims 61 and 71 are presented and have been patterned after the present invention recited in independent claim 37. Applicant submits that these claims likewise are allowable over the cited art. With respect to independent claim 37, the Examiner states that the cited manual discloses an apparatus further comprising a control section which changes a parameter used by the extraction section and the determination section based on a result of the comparing by the determination section (pages 215-220), and evaluating features based on specific parameters. Applicant submits, however, that the noted portion of the cited manual merely discusses that the fiducial finder assigns all likely features a shape score. It also decides if each feature is a fiducial one by comparing its shape score with user-specified parameters. These user-specified parameters are then explained in more detail. Applicant submits, however, that the noted portion of the cited manual does not teach or suggest at least the features of the present invention recited in independent claims 61 and 71 of a control section which changes a parameter used by at least one of the extraction section (step) and the

determination section (step), based on a result of the comparing by the determination section (determining step). Accordingly, the cited manual likewise does not teach or suggest the salient features of Applicant's present invention as recited in independent claims 61 and 71.

Applicant further submits that the remaining art cited does not cure the deficiencies noted with above with respect to the cited manual.

The Examiner relies on the Rostami et al. patent for teaching a system that finds the orientation of a wafer using a camera which captures an image of a mark. Applicant submits, however, that the Rostami et al. patent, as with the cited manual, does not teach or suggest the salient features of Applicant's present invention, as recited in independent claims 37, 49, 61 and 71, which have been discussed above. Therefore, that patent adds nothing to the teachings of the cited manual that would render obvious Applicant's present invention recited in those claims.

For the foregoing reasons, Applicant submits that the present invention, as recited in independent claims 37, 49, 61 and 71, is patentably defined over the cited art, whether that art is taken individually or in combination.

Dependent claims 38-48 and 62-70 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Further individual consideration of these dependent claims is requested.

Applicant further submits that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the rejection set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Steven E. Warner", is written over a horizontal line.

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